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PERKINS COIE LLP
PATENT-SEA
P.O. BOX 1247
SEATTLE, WA 98111-1247

EXAMINER

MUTSCHLER, BRIAN L

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 01/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/836,844

Applicant(s)

HANSON ET AL.

g

Examiner

Brian L. Mutschler

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-18, 20-28, 31-35 and 39-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-18, 20-28, 31-35 and 39-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Comments

1. Applicant's cancellation of claims 9, 19, 29-30, and 36-38 and addition of claims 39-46 in the amendment submitted November 14, 2003, is acknowledged.
2. The objection to minor informalities in the disclosure has been overcome by Applicant's amendment.
3. The rejection of claims 27, 28 and 30-36 under 35 U.S.C. 112, second paragraph, has been overcome by Applicant's amendment.
4. In light of Applicant's remarks, the rejection of claims 1-19, 37 and 38 under 35 U.S.C. 102(b) over Adams et al. has been withdrawn. The axial position of the nozzle in the device of Adams et al. does not change as the support is raised and lowered. Therefore, the device is not capable of performing the intended use of varying the radial position of the contact position of the spray at different positions.
5. The rejection of claims 31-35 under 35 U.S.C. 102 over Reid et al. has been overcome by Applicant's amendment of the claims to depend from newly presented claim 39.

Claim Objections

6. Claims 32 and 42 are objected to because of the following informalities:
 - a. In claim 32 at line 2, it is suggested that consistent claim language be used for the "chemical collector system", which is referred to as a "chemical collection system" in claim 31. Since claim 32 depends from

claim 31, which introduces the chemical collection system, the phrase "a chemical [collection] system" should be changed to --the chemical collection system-- to identify the feature as the same chemical collection system.

- b. In claim 42 at line 1, it appears that "central system" should be changed to --control system--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 31-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 31 recites the limitation "the chemical collection system" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim. Claim 39, from which claim 31 now depends, does not introduce a chemical collection system. The same applies to dependent claims 32 and 33.

Claim 32 recites the limitation "the processing container" in lines 3 and 4. There is insufficient antecedent basis for this limitation in the claim. It is suggested that the phrase be changed to --the processing vessel--. The same applies to dependent claim 33.

Claim 32 recites the limitation "the chemical delivery system" in line 6. The phrase also appears in claim 34 at line 4. There is insufficient antecedent basis for this limitation in the claim. It is suggested that the phrase be changed to --the fluid delivery system--. The same applies to dependent claims 33 and 35.

Claim 34 recites the limitation "the control system" in line 2. There is insufficient antecedent basis for this limitation in the claim. A similar limitation appears in claim 35 at line 2. Claim 39, from which claim 34 now depends, does not introduce a control system.

Claim 34 recites the limitation "the at least one surface" in lines 5, 7, and 9. There is insufficient antecedent basis for this limitation in the claim. The same applies to dependent claim 35.

Claim 35 recites the limitation "the drive mechanism" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is suggested that the phrase be changed to --the drive system--.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-8, 10-18, and 20-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Reid et al. (U.S. Pat. No. 6,099,702).

Regarding claims 1, 11, and 20, Reid et al. disclose an electroplating chamber for plating semiconductor wafers comprising:

- a) A workpiece support **190**. The workpiece support **190** is adapted to hold a wafer **W** and is also adapted to provide electroplating power to the workpiece (fig. 1; col. 3, lines 9-11).
- b) A processing container **110**. The plating cell comprises an inner processing container **110**, which is contained within an outer container having walls **132** (fig. 1).
- c) A drive mechanism **170**. The drive mechanism **170** is an actuator capable of moving the support **190** in a vertical direction through a plurality of different positions (fig. 1; col. 3, lines 9-16).
- d) A first chemical delivery system. The first chemical delivery system comprises a pump **122** and an inlet **118** for supplying the electroplating solution to the cell (fig. 1; col. 2, lines 38-48).
- e) A first chemical collector system. Walls **112** and **132** form a channel surrounding the processing chamber **110** to reclaim excess solution **S** (fig. 1; col. 2, lines 56-67).

- f) A second chemical delivery system. The second chemical delivery system comprises a nozzle **160** to deliver a spray of a second solution to the wafer **W** (fig. 1; col. 3, lines 25-40).
- g) A second chemical collector system. The second chemical collector system comprises channel **140** to collect waste from the second chemical delivery system (fig. 1; col. 3, lines 41-55).
- h) A control system **198**. The drive mechanism **170** is controlled by controller **198** to move between the different processing positions (fig. 1; col. 3, lines 9-16).

Regarding claims 2, 5, 17, 18, 22, and 24, Reid et al. disclose that the wafer support **190** and wafer **W** are spun (col. 3, lines 25-26). During spinning at position **3**, the solution is flung into the channel **140** (col. 3, lines 41-55).

Regarding claims 3, 4, 21 and 23, Reid et al. disclose that plating is performed at a first position, position **1**, and rinsed with a solution from nozzle **160** at positions **2** and **3** located above position **1** (fig. 1; col. 3, lines 17-55). As taught by Reid et al., rinsing with a spray solution from nozzle **160** can occur in different positions, i.e., positions **2** and **3** (col. 3, lines 25-55).

Regarding claims 6, 16, and 25, the second chemical collection system comprising channel **140** has two walls **132** and **142**, corresponding to the "splash wall" and "further wall" recited in the instant claims, that form the channel **140** (fig. 1).

Regarding claims 7 and 26, an outlet **146** drains the excess waste from the collection channel **140** (fig. 1; col. 3, lines 1-8).

Regarding claim 8, the control system **198** directs the drive mechanism **170** to different positions (fig. 1; col. 3, lines 9-16). Since the nozzle **160** shown in Figure 1 is positioned to direct the spray at an angle above the horizontal and the workpiece support **190** is located below the horizontal with respect to the nozzle, as the workpiece support is raised, the spray coming from the nozzle would initially impinge on an area less than an entire radius of the workpiece.

Regarding claim 10, the second chemical delivery system, nozzle **160**, is capable of delivering a stream of processing fluid to a fixed location. Reid et al. disclose that the nozzle **160** is "directed" (col. 4, lines 10-19).

Regarding claims 12, 13, 27, and 28, the actuator **170** is capable of moving the support **190** in a vertical direction (fig. 1; col. 3, lines 9-16). The support **190** can also be rotated (spun) relative to the container **110** (col. 3, lines 25-55).

Regarding claims 14 and 15, the device of Reid et al. comprises two chemical delivery systems, i.e., nozzle **160** and pump **122**/inlet **118**, and two chemical collector systems, i.e., channels **130** and **140** (fig. 1; col. 2, line 38 to col. 3, line 55).

Since Reid et al. teach all of the structural limitations recited in the instant claims, the reference is deemed to be anticipatory. It is noted that the instant claims recite many process limitations, e.g., "the second chemical collector systems collects spent processing fluids as the spent processing fluid is flung from the microelectronic workpiece during spinning" (claim 5). The apparatus of Reid et al. is deemed capable of performing the recited intended uses of the apparatus and thus anticipates the claims.

11. Claims 39-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang (U.S. Pat. No. 6,391,166).

Regarding claim 39, Wang discloses an apparatus for processing a microelectronic workpiece comprising a workpiece support **29** to hold a workpiece **31** and a processing vessel to receive the workpiece (fig. 66). The apparatus further comprises a drive system coupled to the workpiece support to move the workpiece along a first axis relative to the processing vessel between a first position and a second position (col. 41, lines 25-49; col. 45, lines 20-43). The drive system is also configured to tilt the workpiece support relative to the vessel about a second axis transverse to the first axis (fig. 66; col. 41, lines 25-49). The apparatus has a fluid delivery system (pump) that directs a stream of processing fluid toward the workpiece support (fig. 66; col. 41, lines 25-49).

Regarding claims 40 and 41, the fluid delivery system is positioned to direct processing fluid toward the workpiece support **29** while the workpiece is in a first position, where an edge of the workpiece first touches contacts the solution, and while the workpiece is in a second position, where the workpiece is fully immersed in the solution (fig. 66; col. 41, lines 25-49).

Regarding claim 42, the apparatus comprises a control system coupled to the drive system to direct the drive system to move the workpiece support (col. 45, lines 20-43). Although not a structural limitation, in the method disclosed by Wang, the drive system moves the workpiece while the fluid delivery system is directing the stream of

processing fluid, i.e., from the time of delivery to the bath in step 1 to when the pump is turned off in step 6 (col. 41, lines 25-49).

Since Wang teaches all of the structural limitations recited in the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-5, 8, 10, 20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dordi et al. (U.S. Pat. No. 6,416,647).

Regarding claims 1 and 20, Dordi et al. disclose an electroplating apparatus for processing semiconductor wafers comprising:

- a) A workpiece support **204** (fig. 2).
- b) A processing container **100** (fig. 2).
- c) A drive mechanism. The drive mechanism comprises an actuator **346** that is capable of moving the workpiece to a plurality of locations (col. 16, lines 21-23).
- d) A plurality of chemical delivery systems. The apparatus has means to provide an electroplating solution and a rinsing solution to the workpiece

(col. 15, lines 12-25; col. 16, lines 7-20). One chemical delivery system comprises spouts **260** to spray the rinsing solution (col. 16, lines 7-10).

- e) A plurality of chemical collector systems. The plurality of chemical collector systems comprises outlets **258** and **259** (fig. 2).

Regarding claims 2, 5, 22 and 24, the substrate support member **204** is capable of spinning to dry the workpiece, i.e., removing the solution (col. 16, lines 15-20).

Regarding claims 3 and 4, the position for plating the wafer is located vertically above the position for rinsing the wafer (col. 16, lines 7-8).

Regarding claim 8, the spouts **260** are directed at an angle below the horizontal and the workpiece support **204** is located above the horizontal with respect to the spouts (fig. 3). Therefore, as the workpiece support **204** is lowered, the spray from the spout would initially impinge on less than an entire radius of the workpiece.

Regarding claim 10, the spouts **260** are capable of delivering a stream to a fixed position.

The apparatus of Dordi et al. differs from the instant invention because Dordi et al. do not disclose a control system to direct the drive mechanism, as recited in claims 1, 8 and 20.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Dordi et al. to use a control system to direct the drive mechanism because providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient

to distinguish over the prior art (see *In re Venner*, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958)).

14. Claims 31-35 and 39-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. (U.S. Pat. No. 6,099,702) in view of Wang (U.S. Pat. No. 6,391,166).

Regarding claim 39, Reid et al. disclose an electroplating chamber for plating semiconductor wafers comprising:

- a) A workpiece support **190**. The workpiece support **190** is adapted to hold a wafer **W** and is also adapted to provide electroplating power to the workpiece (fig. 1; col. 3, lines 9-11).
- b) A processing container **110**. The plating cell comprises an inner processing container **110**, which is contained within an outer container having walls **132** (fig. 1).
- c) A drive mechanism **170**. The drive mechanism **170** is an actuator capable of moving the support **190** in a vertical direction through a plurality of different positions (fig. 1; col. 3, lines 9-16).
- d) A fluid delivery system. The fluid delivery system comprises a pump **122** and an inlet **118** for supplying the electroplating solution to the cell (fig. 1; col. 2, lines 38-48).

Regarding claim 31, Reid et al. disclose that the wafer support **190** and wafer **W** are spun (col. 3, lines 25-26). During spinning at position **3**, the solution is flung into the channel **140** (col. 3, lines 41-55).

Regarding claim 32, the chemical collection system comprising channel **140** has two walls **132** and **142**, corresponding to the "splash wall" and "further wall" recited in the instant claims, that form the channel **140** (fig. 1).

Regarding claim 33, an outlet **146** drains the excess waste from the collection channel **140** (fig. 1; col. 3, lines 1-8).

Regarding claim 34, the apparatus has a control system **198** that directs the drive mechanism **170** to different positions (fig. 1; col. 3, lines 9-16). Since the nozzle **160** shown in Figure 1 is positioned to direct the spray at an angle above the horizontal and the workpiece support **190** is located below the horizontal with respect to the nozzle, as the workpiece support is raised, the spray coming from the nozzle would initially impinge on an area less than an entire radius of the workpiece.

Regarding claim 35, the actuator **170** is capable of moving the support **190** in a vertical direction (fig. 1; col. 3, lines 9-16). The support **190** can also be rotated (spun) relative to the container **110** (col. 3, lines 25-55).

Regarding claims 40 and 41, the fluid delivery system is positioned to direct fluid toward the workpiece in both the first and second positions (fig. 1; col. 3, lines 17-55).

Regarding claim 42, the drive mechanism **170** is controlled by controller **198** to move between the different processing positions (fig. 1; col. 3, lines 9-16).

The apparatus of Reid et al. differs from the instant invention because Reid et al. does not teach that the drive system is configured to tilt the workpiece support relative to the vessel about a second axis generally transverse to the first axis, as recited in claim 39.

Regarding claim 39, Wang teaches an apparatus for processing microelectronic workpieces comprising a drive system having three drive mechanisms (col. 45, lines 20-43). The drive mechanisms of Wang allow the workpiece support **29** to be moved along an axis between a first position and a second position (col. 45, lines 20-43). Additionally, the drive mechanisms allow the workpiece support **36** to be tilted along a second axis transverse to the first axis (fig. 66; col. 41, lines 20-43). Tilting the workpiece support **36** allows for enhanced film uniformity through control of the thickness distribution of the plated layer (col. 41, lines 25-49).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Reid et al. to use a drive system including the ability to tilt as taught by Wang because tilting allows for enhanced film uniformity through the control of the thickness distribution of the plated layer.

15. Claims 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. (U.S. Pat. No. 6,099,702) in view of Patton et al. (U.S. Pat. No. 6,156,167).

Regarding claim 43, Reid et al. disclose an electroplating chamber for plating semiconductor wafers comprising:

- a) A workpiece support **190**. The workpiece support **190** is adapted to hold a wafer **W** and is also adapted to provide electroplating power to the workpiece (fig. 1; col. 3, lines 9-11). Although Reid et al. do not explicitly disclose the structure of the contact, Reid et al. do teach that the workpiece support **190** may be any holder capable of holding a wafer such as a clamshell apparatus described in U.S. Pat. App. No. 08/969,984, which has issued as U.S. Pat. No. 6,156,167 (col. 4, lines 51-57).
- b) A processing container **110**. The plating cell comprises an inner processing container **110**, which is contained within an outer container having walls **132** (fig. 1).
- c) A drive mechanism **170**. The drive mechanism **170** is an actuator capable of moving the support **190** in a vertical direction through a plurality of different positions (fig. 1; col. 3, lines 9-16).
- d) A fluid delivery system. The fluid delivery system comprises a pump **122** and an inlet **118** for supplying the electroplating solution to the cell (fig. 1; col. 2, lines 38-48). The fluid delivery system is positioned to direct at least one stream of processing fluid toward the workpiece support **190** (fig. 1).

Regarding claim 44, the apparatus has a control system **198** that directs the drive mechanism **170** to different positions (fig. 1; col. 3, lines 9-16).

The apparatus of Reid et al. differs from the instant invention because Reid et al. do not disclose the following:

- a. The workpiece support includes an electrical contact positioned to contact the microelectronic workpiece, and the fluid delivery system is positioned to direct at least one stream of processing fluid toward the workpiece support to impinge on the contact, as recited in claim 43.
- b. The workpiece support includes a seal disposed around the electrical contact, and the fluid delivery system is positioned to direct at least one stream of processing fluid to impinge on the seal, as recited in claim 45.

Regarding claims 43 and 45, the workpiece support of Patton et al. comprises a contact **72** and a seal **58** (fig. 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Reid et al. to use a workpiece support having a contact and seal as taught by Patton et al. because Reid et al. specifically suggest the use of such a workpiece holder (see US '702, col. 4, lines 51-57). Since the nozzle of Reid et al. is directed toward the workpiece support and is capable of impinging on the entire surface of the workpiece, the nozzles are also capable of impinging on the contact and seal, which are located at a position within the peripheral edge of the workpiece.

16. Claims 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng (U.S. Pat. No. 6,280,581) in view of Wang (U.S. Pat. No. 6,391,166).

Regarding claim 43, Cheng discloses an apparatus for processing a microelectronic workpiece **60** comprising a workpiece support **36** for holding the

workpiece, wherein the workpiece support includes a contact **110** contained within an electrode assembly, or clamp, **58** (figs. 7 and 7A-7D). The apparatus further comprises a processing vessel **42** configured to receive a workpiece **60** held by the workpiece support **36** (fig. 5). A shaft **56** is coupled to the workpiece support **36** to raise and lower the support along an axis relative to the processing vessel **42** between a first position and a second position (figs. 4, 5, 9, and 10; col. 7, lines 50-60). The support is also designed to be rotated (col. 8, lines 5-19). A fluid delivery system is positioned to direct at least one stream of the processing fluid toward the workpiece support to impinge on the electrical contact (col. 7, line 61 to col. 8, line 4). It is noted that the fluid delivery system directs fluid to impinge on the electrical contact whether a workpiece is held by the support or not (col. 7, line 61 to col. 8, line 4); the presence of a workpiece is a process limitation that does not further limit the structure of the apparatus.

Regarding claim 44, although a process limitation, the workpiece support is moved during the application of the stream of processing fluid (col. 8, lines 5-19).

Regarding claim 45, the workpiece support **36** further comprises a seal **109** around the electrical contact **110** (fig. 7A; col. 8, line 46 to col. 9, line 5). The same fluid directed at the electrode assembly would also be directed at the seal.

The apparatus of Cheng differs from the instant invention because Cheng does not teach the following:

- a. A drive system to move the workpiece support, as recited in claim 43.
- b. A controller coupled to the drive system to direct the drive system to move the workpiece support, as recited in claim 44.

- c. The drive system is configured to tilt the workpiece support relative to the vessel about a second axis transverse to the first axis, as recited in claim 46.

Regarding claims 43, 44, and 46, Wang teaches an apparatus for processing microelectronic workpieces comprising a drive system having three drive mechanisms (col. 45, lines 20-43). Like the workpiece support **36** of Cheng that moves along an axis from a first position to a second position, the drive mechanisms of Wang allow the workpiece support **29** to be moved along an axis between a first position and a second position (col. 45, lines 20-43). Additionally, the drive mechanisms allow the workpiece support **36** to be tilted along a second axis transverse to the first axis (fig. 66; col. 41, lines 20-43). Tilting the workpiece support **36** allows for enhanced film uniformity through control of the thickness distribution of the plated layer (col. 41, lines 25-49). The drive system of Cheng is controlled by a control system to provide a uniform thickness film on the workpiece (col. 45, lines 20-43).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Cheng to use a drive system including the ability to tilt as taught by Wang because a drive system automates the processing of the workpiece and tilting allows for enhanced film uniformity through the control of the thickness distribution of the plated layer. In addition, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Cheng to use a controller as taught by Wang because a

controller that controls the movement of the drive system helps provide a uniform thickness film on the workpiece.

Response to Arguments

17. Applicant's arguments filed November 14, 2003, have been fully considered but they are not persuasive.

18. Regarding the 102 rejection of claims 1-38 based on Reid, Applicant argues, "Reid fails to disclose or suggest a controller that is 'configured to direct the drive mechanism to move the workpiece support during application of the spray from the second chemical delivery system so as to vary the radial position of the initial contact between the spray and the microelectronic workpiece'" (see page 18 of Applicant's response). Applicant further states *In re Alappat* as support that "programming creates a new machine once it is programmed to perform particular functions pursuant to instructions from program software" (see page 18 of Applicant's response).

19. While Applicant's statements are correct, the instant claims are not distinguished over the reference of Reid. First, *In re Alappat* addressed the statutory patentability of a rasterizer defined by means-plus-function language, where the means performed mathematical calculations. The court held that even though the function of the means was abstract in that one number was manipulated through calculations to reach a second number, the means as defined in the disclosure required logic circuits, which were structurally definable. Therefore, since the rasterizer required physical elements to perform the function, the claim was patentable under 35 U.S.C. 101. In the instant

invention, the disclosure defines the controller as a programmable controller. There is no question that the controller has some physical structure that is operatively coupled to the apparatus to control certain functions. Therefore, the question is whether or not the programming has created a new machine that is distinguished over the apparatus of Reid. Looking at the present disclosure, the controller is defined as a programmable controller that can control lift/rotate apparatus to control the vertical motion of the reactor head, as well as the ability to adjust the spin rate of the rotor motor (see page 8, first full paragraph of the instant disclosure). The control system is used to move the workpiece to a plurality of positions. No additional functionality is disclosed. Therefore, the controller, as defined by the instant disclosure, is required to be programmed to move the workpiece to a plurality of different positions and to have the ability to rotate the workpiece. It is noted that the controller has no disclosed relationship to the fluid delivery system and is therefore only to control the motion of the workpiece. Since Reid teaches a controller that is programmed (i.e., directed by instructions) to control the movements of the workpiece, the controller of Reid has all of the limitations required by the instant claims, including the most complete definition as provided by the present disclosure.

Second, in light of the definition of the controller in the present disclosure, since the controller is only operatively coupled to the drive system to control the movements of the workpiece, any additional functionality recited in the claims relates to the intended use of the apparatus. Therefore, in claim 1, which recites a control system "configured to direct the drive mechanism to move the workpiece support *during application of the*

spray from the second delivery system so as to vary the radial position of the initial contact between the spray and the microelectronic workpiece," the intended use, as indicated by the use of italics, does not structurally limit the device to performing only the desired function. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Since Reid teaches all of the structural limitations recited in the instant claims and the device is also capable of performing the intended use recited in the claim, the reference is deemed to be anticipatory.

20. Regarding the rejection of the claims under 35 U.S.C. 103 over Dordi, Applicant has argued, "Dordi fails to disclose or suggest a control system that is operatively coupled to the drive mechanism to 'vary the radial position of the initial contact between the spray and the microelectronic workpiece'" (see page 20 of Applicant's response). This argument is not persuasive because, as explained above, varying the radial position of the initial contact between the spray and the microelectronic workpiece is an intended use of the apparatus and does not further limit the structure of the claim. Due to the relative position between the nozzles and the workpiece positions, the apparatus of Dordi is capable of performing the intended use when modified to use a control system. As explained in the prior Office action, the use of a control system is an obvious modification to one skilled in the art. A control system allows the automation of

a procedure, which is not sufficient to distinguish over the prior art (see MPEP 2106 and 2144.04).

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (571) 272-1341. The examiner can normally be reached on Monday-Friday from 7:30am to 4:00pm.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

blm
January 12, 2004



NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700